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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,649	07/02/2003	Joo Sun Yoon	21C-0058	5474

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EXAMINER

DUONG, THOI V

ART UNIT PAPER NUMBER

2871

DATE MAILED: 09/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/612,649

Applicant(s)

YOON ET AL.

Examiner

Thoi V. Duong

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 ~~is/are~~ pending in the application.
- 4a) Of the above claim(s) 8-13 and 19-23 ~~is/are~~ withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 14-18 ~~is/are~~ rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the Amendment filed June 21, 2005.

Accordingly, claims 1-3, 7 and 14 were amended, and claim 24 was cancelled.

Currently, claims 1-23 are pending in this application; of these claims, claims 8-13 and 19-23 were withdrawn and claims 1-7 and 14-18 are considered in this office action.

Response to Arguments

2. Applicant's arguments with respect to claims 1 and 14 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 5, 14, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art (Figs. 1-4) in view of Maeda et al. (Maeda, Pub. No. US 2002/0054269 A1).

Re claim 1, as shown in Figs. 1-4, Applicant's Prior Art discloses a reflective-transmissive type liquid crystal display device, comprising:

a first substrate 11, including:

a thin film transistor 12 disposed on a first transparent substrate 11,

an organic insulation layer 13 disposed on the first transparent substrate 11 to insulate the thin film transistor 12, the organic insulation layer 13 having a contact hole 13a for exposing an output terminal of the thin film transistor,

a pixel electrode 14 having a transparent electrode 14a connected to the output terminal 12d of the thin film transistor 12 through the contact hole 13a disposed on the organic insulation layer, and a reflective electrode 14b disposed on a first region of the transparent electrode 14a (both sides of the transparent electrode 14a), a second region 14c of the transparent electrode 14a being exposed without being covered by the reflective electrode 14b, and

an orientation film 15 coated on an upper surface of the pixel electrode 14 and having an orientation groove 15a rubbed in a first direction toward the opening portion 14c (Figs. 2-4);

a second substrate 21, including:

a color filter 22 disposed on a second transparent substrate 21 in opposition to the pixel electrode 14, and

a common electrode 23 disposed on an upper surface of the color filter and facing the pixel electrode 14, and

a liquid crystal 30 interposed between the first and second substrates.

Re claim 5, the second region 14c exposes two edges of the first region of the transparent electrode 14a, and the two edges, one of the vertical edges and one of the horizontal edges of the boundary of the opening 14c, are connected to each other (Figs. 2-4).

Re claim 14, as shown in Fig. 1, Applicant Prior Art discloses a method for fabricating a reflective-transmissive type liquid crystal display device, the method comprising:

forming a thin film transistor 12 on a first transparent substrate 11,

depositing an organic insulation layer 13 on the first transparent substrate 11 to insulate the thin film transistor 12, the organic insulation layer 13 having a contact hole 13a for exposing an output terminal 12d of the thin film transistor 12,

forming a pixel electrode 14 on the organic insulation layer 13, the pixel electrode 14 having a transparent electrode 14a connected to the output terminal 12d of the thin film transistor 12 through the contact hole and a reflective electrode 14b formed on a first region of the transparent electrode 14, a second region of the transparent electrode being exposed without covering by the reflective electrode 14b,

coating an orientation film 15 on an upper surface of the pixel electrode 14;

rubbing the orientation film 15 in a first direction 15a toward the opening portion 14a to form an orientation groove on the orientation film.

forming a color filter 22 on a second transparent substrate 21 in opposition to the pixel electrode 14,

forming a common electrode 23 on an upper surface of the color filter 22, the common electrode 23 facing the pixel electrode 14, and

interposing a liquid crystal 30 between the common electrode 23 and the pixel electrode 14 on which the orientation film and the orientation groove are formed.

Re claim 15, forming a pixel electrode comprises:

Art Unit: 2871

forming the transparent electrode 14a on the first transparent substrate 11 on which the thin film transistor 12 and the organic insulation layer 13 are formed;

forming a metal thin film 14b on an upper surface of the transparent electrode; and

patterning the metal thin film such that the reflective electrode 14b is formed on the first area of the transparent electrode 14a and the boundary between the first and second regions (boundary of the opening 14c) has a linear shape (squared shape) in a layout of the pixel electrode (Figs. 2-4).

Re claim 17, forming a pixel electrode comprises:

forming the transparent electrode 14a on the first transparent substrate 11 on which the thin film transistor 12 and the organic insulation layer are formed,

forming a metal thin film on an upper surface of the transparent electrode 14a, and

patterning the metal thin film such that the reflective electrode 14b is formed on the first region of the transparent electrode and the second region exposes two edges of the transparent electrode 14a, the two edges, one of the vertical edges and one of the horizontal edges of the boundary of the opening 14c, being connected to each other (Figs. 2-4).

However, Applicant's Prior Art does not show edges of the second region including a boundary between the first and second regions and an opening portion where the second region does not contact the first region as recited in claims 1 and 14.

As shown in Figs. 1 and 2, Meada discloses a reflective-transmissive type liquid crystal display device D comprising a pixel electrode 6 including a reflective electrode 6a disposed on a first region R and a transparent electrode 6c disposed in a second region T without being covered by the reflective electrode, edges of the second region T including a boundary 2a (recessed portion) between the first and second regions R and T and an opening portion (between 2a) where the second region T does not contact the first region R; and an alignment layer 7 coated on an upper surface of the pixel electrode 6.

Re claim 2, as shown in Figs. 1 and 2, the boundary 2a of the first and second regions includes at least two straight lines in a layout of the pixel electrode 6 (along the edge 6b of the pixel electrode,

wherein, re claim 3, as shown in Fig. 21, the first direction 2106 is parallel to the boundary (page 10, paragraph 120).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Applicant's Prior Art with the teaching of Maeda by forming a pixel electrode having a reflective electrode formed in the first region and a transparent electrode formed in the second region, edges of the second region including a boundary between the first and second regions and an opening portion where the second region does not contact the first region so as to obtain higher brightness at the same drive voltage as that in the transmissive display or in the reflective display (paragraph 68, pages 5 and 6).

Since Applicant's Prior Art in view of Maeda has the same structure with the instant invention, it is obvious that the orientation groove also prevents impurity from being stacked at the boundary between the first and second regions of the transparent electrode (Figs. 2-4).

5. Claims 4, 6, 7, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art in view of Maeda et al. (Maeda, Pub. No. US 2002/0054269 A1) as applied to claims 1-3, 5, 14, 15, 17 and 24 above, and further in view of Kubo et al. (Kubo, USPN 6,452,654 B2).

Applicant's Prior Art in view of Meada discloses a reflective-transmissive type liquid crystal display device as well as a method for fabricating the same that is basically the same as that recited in claims 4, 6, 7, 16 and 18 except forming the sidewall inclined to prevent the impurity from being stacked at the boundary.

As shown in Figs. 8A and 8B, Kubo discloses a reflective-transmissive type liquid crystal display device comprising a pixel electrode having a transparent electrode 51 and a reflective electrode 50 disposed on a first region of the transparent electrode 51 (both sides of the transparent electrode 51) and a second region of the transparent electrode 51 (middle portion of the transparent electrode 51) being exposed without being covered by the reflective electrode 50,

wherein, re claims 4, 6 and 18, the reflective electrode 50 includes a sidewall making contact with the boundary of the first and second regions, and the sidewall is inclined as shown in Fig. 8B; and

wherein, re claim 7 the boundary between the first and second regions, and the first region each have a L-shaped configuration as shown in Fig. 8A.

Since the structure of the reflective electrode of Kubo is the same as that of the invention, it is obvious that the inclined sidewall also prevents the impurity from being stacked at the boundary of the first and second region.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the Applicant's Prior Art with the teaching of Kubo by forming an inclined sidewall of the reflective electrode at the first region adjacent to the boundary for not only preventing the impurity from being stacked at the sidewall of the reflective electrode but also improving the aperture ratio of the pixel (col. 14, lines 48-55).

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2871

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (571) 272-2293.

Thoi Duong



09/02/2005



DUNG T. NGUYEN
PRIMARY EXAMINER